

US CLAIMS:

EC 210

1. Structured multi-purpose packings containing material separation elements (1) and second functionality elements (2) provided in alternate layers, wherein the material separation elements have a profiled surface, and each of the second functionality elements has two or more closed chambers (3) provided on top of each other and filled with a physically, chemically or biologically active packing material, a space being provided between any two of the chambers, which space is bridged by a section (6) conducting a liquid, characterized in that the walls of the chambers of the second functionality elements are constituted by a polymeric material.
2. The structured multi-purpose packings according to claim 1, characterized in that the polymeric material comprises polyamides, preferably nylon, polyolefins, preferably polyethylene, or halogenated, preferably fluorinated, polyolefins, especially polytetrafluoroethylene or polyvinyl chloride.
3. The structured multi-purpose packings according to claim 1 or 2, characterized in that the walls of the chambers of said second functionality elements are in the form of woven, knitted, braided or open-meshed fabrics.
4. The structured multi-purpose packings according to claim 1, characterized in that said physically, chemically or biologically active packing material for the chambers of the second functionality elements is in a solid or liquid form.
5. The structured multi-purpose packings according to claim 1, characterized in that said packing material comprises ion exchangers, active charcoal, support materials with biofilms or extractants.

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6. A process for the combined performance of a physical material separation with a chemical or biological process or with a second physical material separation process which is different from the first physical material separation, characterized by employing a structured multi-purpose packing according to claim 1.
7. The process according to claim 6, characterized in that said physical material separation is a distillation, rectification, absorption, adsorption or extraction.
8. The process according to claim 6, characterized in that said chemical process is an alkylation, isomerization, esterification, etherification, hydration, dimerization, oligomerization or polymerization.
9. The process according to claim 6, characterized by being a heterogeneous reactive rectification, reactive absorption, reactive adsorption, adsorption to biofilms, or a material separation with simultaneous biological conversion.
10. The process according to claim 9 for the preparation of tertiary alcohols by reacting tertiary olefins having the same number of carbon atoms with water on an acidic ion exchanger.
11. The process according to claim 9 for the preparation of tertiary C<sub>4</sub> to C<sub>8</sub> alcohols, preferably C<sub>5</sub>, C<sub>6</sub> or C<sub>7</sub> alcohols, especially tertiary amyl alcohol, by reacting the corresponding tertiary olefins, especially tertiary C<sub>5</sub>, C<sub>6</sub> or C<sub>7</sub> olefins, especially isoamylene, with water on an acidic ion exchanger.